The WestGrid Collaboration and Visualization Network

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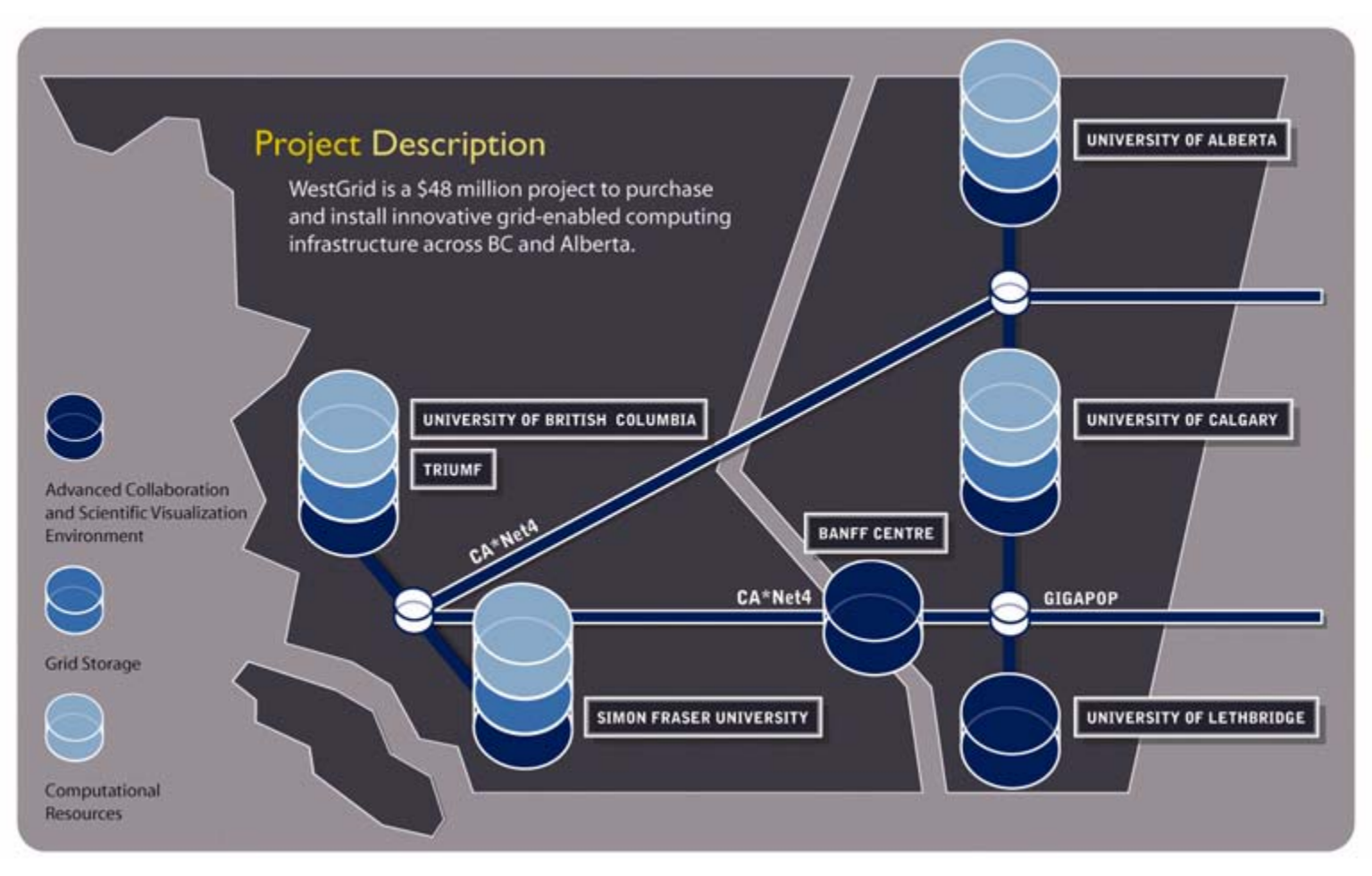
Overview

- What is WestGrid?
- WestGrid Collaboration and Visualization
- Integrating visualization services into AG

What is WestGrid?



WestGrid Grid Philosophy

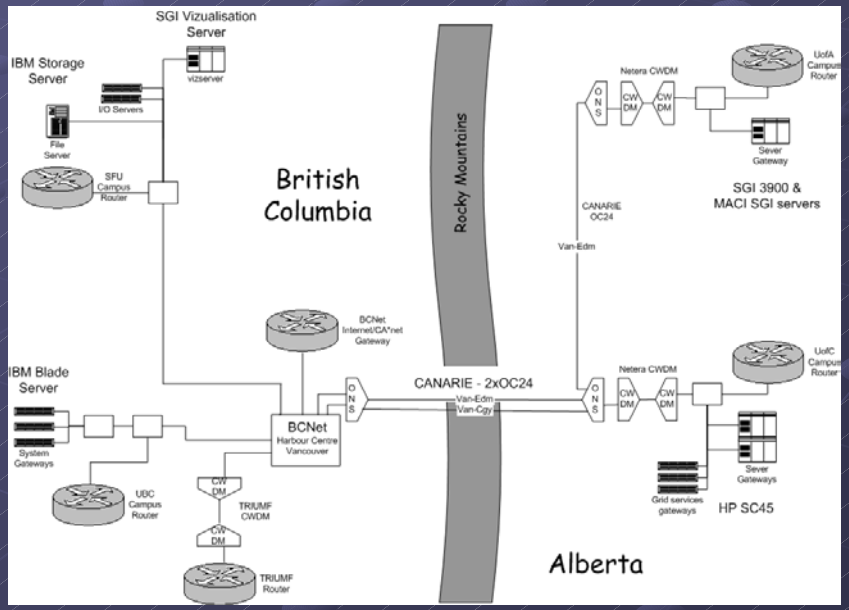
- Provide a range of computational resources to the Western Canada (and national) community
- Provide “seamless” access to the resources through advanced networking
- Promote the use of Grid technologies to user/projects that can benefit from them
- Encourage the use of “robust” grid tools in place of traditional alternatives
- Don’t impose the use of grid tools on users that don’t need them or that already have a good process in place
- Deployment of Globus at all sites
  - GSI based single sign on, gatekeepers for scheduling, meta-schedulers

WestGrid HPC

- Large shared memory (UoA)
  - 256 Processor SGI Origin, 6 smaller Origin servers (8 to 64 processors)
- Large cluster (UBC)
  - 1008 processor IBM blade server
- Tightly coupled message passing (UoC)
  - 144 processor HP SC45
- Storage server (SFU)
  - 25 TB disk, 135 TB on-line tape
- Visualization server (SFU)
  - 20 processor, 8 pipe SGI Ultimate Vision

WestGrid Networking

- HPC/storage sites connected by WAN
  - Layer-2, gigabit-per-second
  - Appears as a local subnet
  - Jumbo-frame
  - Spans 800 km
- Uses CANARIE/ORANs
  - BCNet in BC
  - Netera in Alberta



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Why Collaboration and Visualization (CV)?

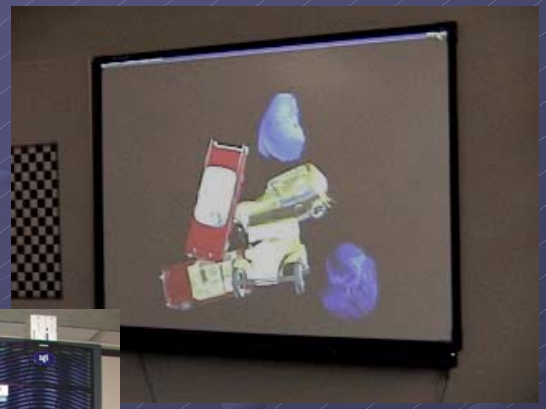
- The goal of grid computing: accelerate understanding
- The human element of grid computing
  - People are arguably the most important “grid resource”
- How do we accelerate understanding?
  - Understanding through visualization
  - Understanding through collaboration
  - The right people, at the right time, with the right information
- WestGrid has deployed a CV infrastructure

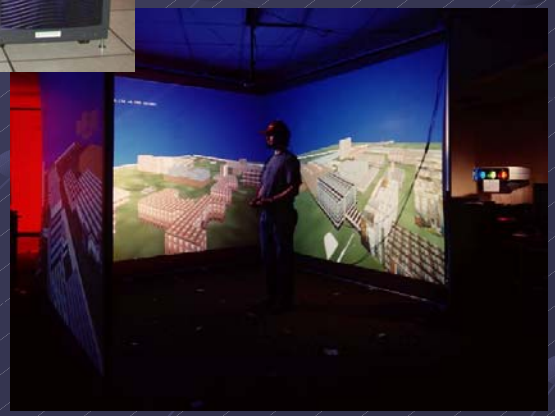
The WestGrid Collaboration Infrastructure

- AccessGrid foundation
  - AG rooms deployed at each site
  - AG VenueServer
    - Functional and Research venues
    - Bridging for all venues
    - GridCanada certificates
- Wide range of scales and types
  - Large scale, multi-user rooms
  - Smart interaction environments
  - Visualization laboratories
- Extended collaboration services
  - Integrated visualization services
  - Extended collaboration services

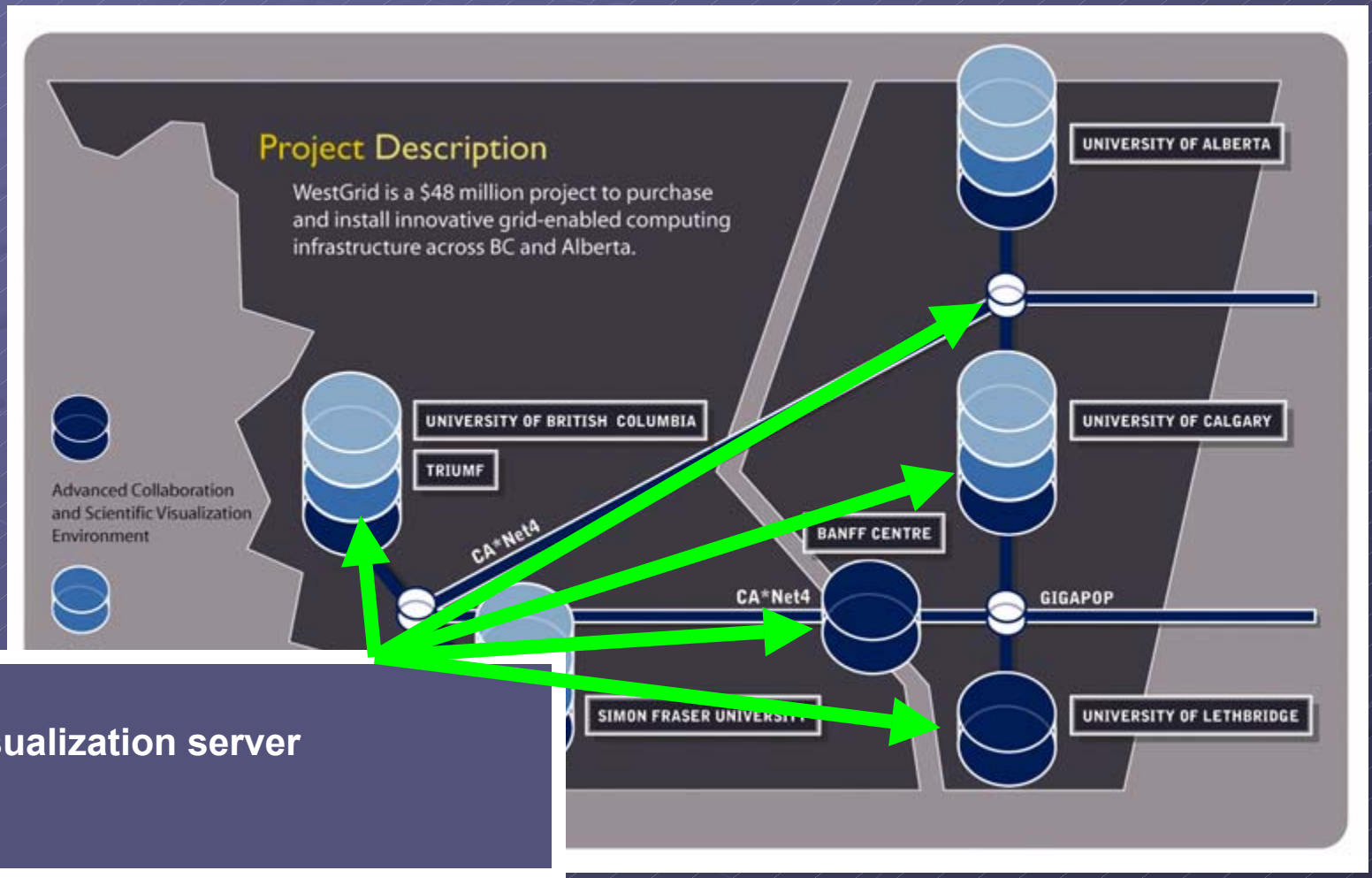
The WestGrid Visualization Infrastructure

- Visualization technologies
  - SGI visualization server
    - Visualization to the desktop
    - Access to high end visualization
      - 20 processors, 8 “pipes”
    - Centralized management
      - Hardware, software, expertise
    - Utilizes core WestGrid network
  - Visualization displays
    - Provide access to researchers
    - Range of displays types
      - Fully immersive VR rooms
      - Low cost passive stereo
      - No glasses auto-stereo
- Challenges
  - How to integrate visualization into our collaboration environments





Visualization Server



SFU:
Visualization server

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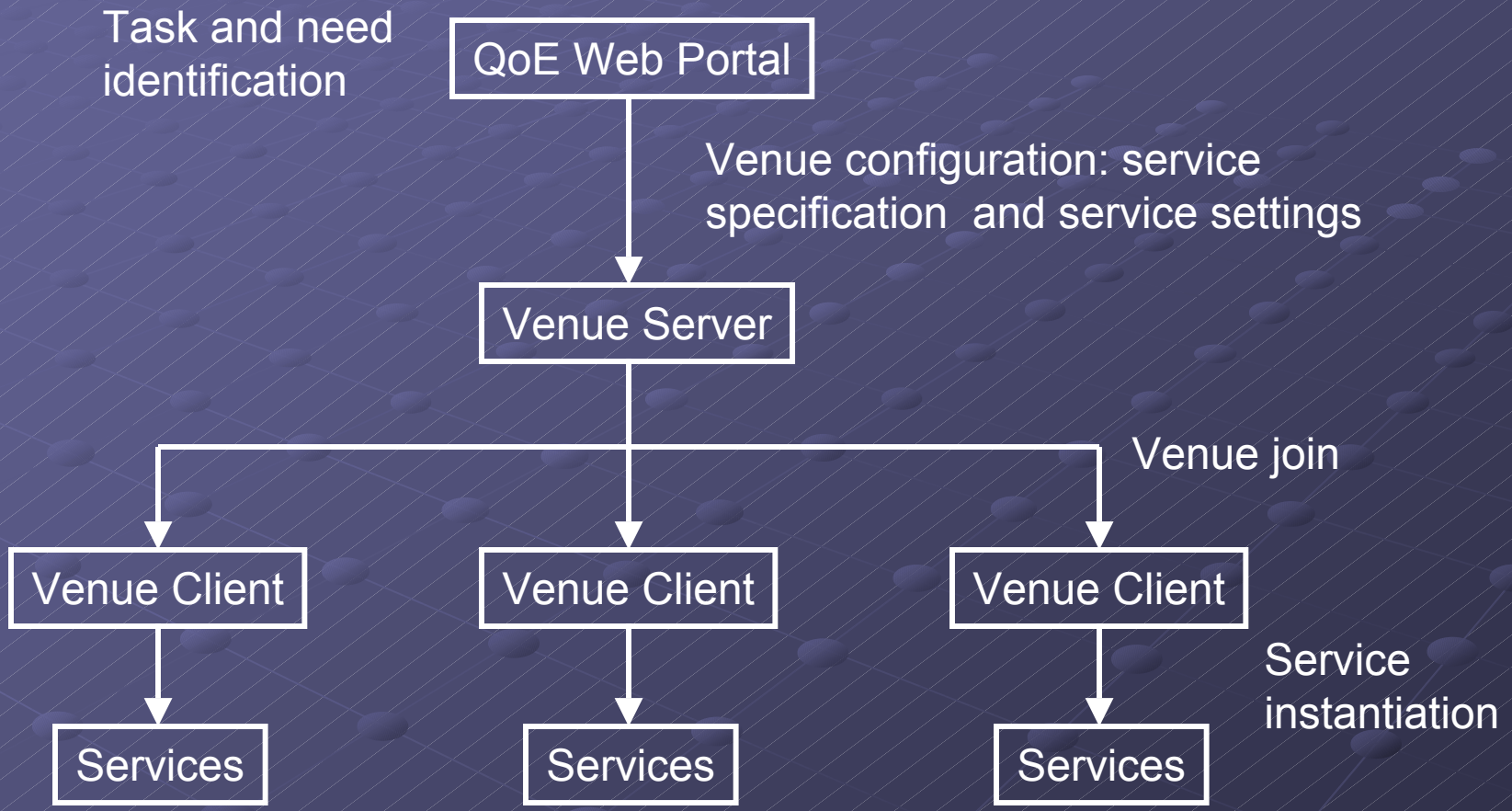
Quality of Experience in Advanced Collaboration Environments

- What is QoE?
  - Measure of human experience, not technology
  - User satisfaction requires a good experience
- How do we deliver?
  - Task: What is the user trying to do?
  - Need: What do they need to accomplish the task?
  - Services: What services meet the needs?
  - Technologies: What technologies can provide services?
- Collaboration with the NRC
  - http://www.andrewpatrick.ca/cv/WACE-2003-Corrie-et-al.pdf

Quality of Experience and AccessGrid

- Identifying tasks and needs
  - What is the user trying to accomplish?
    - E.g. Collaborative visualization of molecular data set
    - Create/reserve a venue for the specific task
  - What are the requirements/needs
    - Audio, video, shared molecular visualization
- Deploying services and technologies
  - Creating and configuring services
    - Populate venue with appropriate services/applications
      - Rat, vic, RasMol
    - Configure services/applications in the venue for task at hand
  - Deploying services on technologies
    - Services are automatically deployed when venue entered
    - Configured as required for the task

The QoE AG process

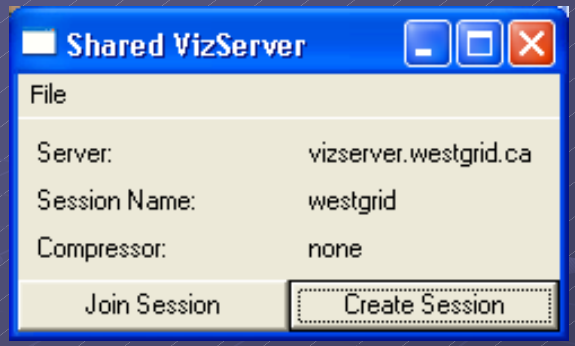


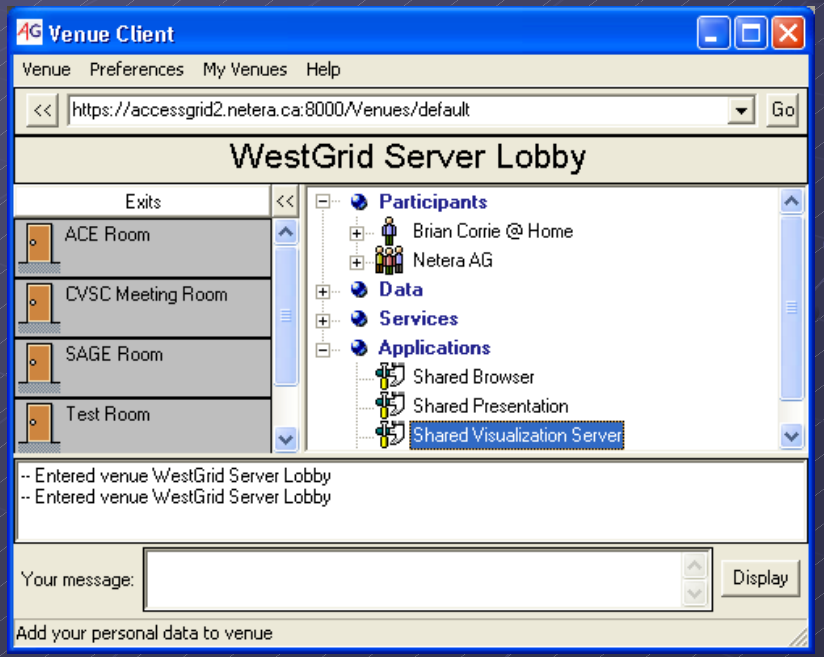
Where are we at?

- Populating and configuring venues
  - Task based web portal
    - Identifies service requirements
  - Exploring how to populate a venue
    - Add apps/services to a venue
    - Add app/service config to a venue
    - Add data to a venue
  - Need to add visualization features to the portal

Where are we at?

- Visualization services are available
  - Shared RasMol (Argonne)
  - Shared ImmersaView (EVL)
  - Shared VizServer (WestGrid)
    - Alpha version complete
    - Beta to be publicly available soon
    - Issues
      - Requires separate authentication
      - Application start up
      - Data in the venue (Grid URL)





What do we need?

- Node Services vs Shared Apps
  - Node services
    - + Node, not machine based
    - + Use a StreamDescription for configuration
      - – Can this be used to control the stream (extensible)?
    - – Node controlled, not venue controlled
      - – Need a way to configure services from venue
  - Shared Apps
    - + Venue controlled
      - + Can add features based on purpose, not based on node
    - – Venue, not node based
      - – Can't start up shared apps on other machines in a node

What do we need?

- Documentation
  - *"The documentation is thin…"*
    - Ivan Judson, Scheduling and AG, AG Retreat 2004
  - Current process
    - Read high level documentation (not clear if it is up to date)
    - Read code (example Shared Apps, Node Services)
    - Modify code
  - Difficult to determine what is possible
    - How can we populate venues?
    - What mechanisms are there for storing data in a venue?
    - What mechanisms are there for communicating info?
      - Venue data store, shared app data store, event mechanism, stream description

Questions?